

EMERGENCY ACTION CARDS

A Supplementary resource
of 5th Edition, Transfer of the
Critically Ill Adult



EMERGENCY ACTION CARDS

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Key Basic Plan

The Key Basic Plan will detect, identify and fix or temporise almost all initial problems. Specific problems are addressed in dedicated Emergency Action Cards (EACs).

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Adequate oxygen delivery**
 - Check oxygen flow and set FiO₂ to 1.0
 - Visual inspection of entire ventilator circuit
 - Check alarms
- 2 **Airway**
 - Own airway: confirm patency, listen for noise
 - ETT/trache: confirm position/patency and exclude leak
 - Check capnography trace
 - Consider whether you need to isolate equipment (Box B)
- 3 **Breathing**
 - Check chest symmetry, breath sounds, RR, SpO₂, measured VTexp
 - Is there EtCO₂?
 - Review airway pressure using ventilator and/or Mapleson C system
- 4 **Circulation**
 - Check rate, rhythm, perfusion
 - Re-check BP
 - Consider fluid bolus
 - If pregnant and hypotensive, position patient in left lateral
- 5 **Drugs**
 - Check patency of IV access
 - Confirm infusions running at appropriate rate
- 6 **Equipment**
 - Check power, oxygen, monitoring, pumps
- 7 **Next steps (Box C)**
 - Inform receiving hospital and responsible consultant when able and appropriate
 - Complete incident form when back at hospital/base

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT TO EXCLUDE EQUIPMENT FAULT

- Ventilate lungs using Mapleson C system connected DIRECTLY to ETT or tracheostomy tube connector
- DO NOT use the HME filter, angle piece or catheter mount
- If remains difficult to ventilate with Mapleson C system, re-connect ventilator
- If increased pressure NOT manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: check and replace

Box C: NEXT STEPS

- If emergency has not been resolved, or patient condition significantly changed, consider:
- Return to referring hospital
 - Diversion to nearest Emergency Department
 - Expedite journey to receiving hospital

EMERGENCY ACTION CARDS

Clinical Scenarios

Anaphylaxis

Consider anaphylaxis when unexplained symptoms arise or unexpected cardiac arrest occurs

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Immediate actions**
 - Follow Key Basic Plan
 - Check pulse: if no pulse, treat as cardiac arrest (→ EAC)
- 2 **Remove trigger**
 - Important culprits: antibiotics, neuromuscular blocking agents, blood product transfusion
- 3 **Elevate patient's legs if there is hypotension**
- 4 **Treat hypotension (Box C):**
 - Remember it may be resistant and may require prolonged treatment
 - Adrenaline bolus and repeat as necessary x 3 then infusion
 - IV fluid bolus 1000ml
 - If hypotension resistant, give alternate vasopressor (e.g. noradrenaline)
- 5 **Next steps**
 - If patient condition significantly changed, consider:
 - Return to referring hospital
 - Diversion to nearest Emergency Department
 - Expedite journey to receiving hospital
 - If likely blood component reaction:
 - Administer intravenous hydrocortisone (200mg) and chlorphenamine (10mg)
 - Ask receiving hospital to take sample for mast cell tryptase

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- Unexplained hypotension
- Unexplained bronchospasm (wheeze may be absent if severe)
- Unexplained tachycardia / bradycardia
- Angioedema (often absent in severe cases)
- Unexplained cardiac arrest where other causes are excluded
- Cutaneous flushing in association with one or more of the above

Box C: DRUGS FOR ANAPHYLAXIS

- Adrenaline bolus:**
 - IV/IO 50mcg (0.5ml of 1:10,000)
 - IM 500mcg (0.5ml of 1:1,000) only if no IV access
- Adrenaline infusion regimes (adult):**
 - 0.5mg (0.5ml 1:1,000) in diluted to 50 ml with 0.9% sodium chloride (10 mcg/ml)
 - Start at 0.5-1.0ml/kg/hr

Bradycardia

Bradycardia may be the result of the underlying disease process or as a response to treatment

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Check pulse:
 - If no pulse, treat as cardiac arrest (→ EAC)
 - If critical bradycardia with hypotension use Box B

2

Breathing

- Exclude **hypoxia** and **hypercarbia** as causes

3

Circulation

- Check rhythm – differentiate sinus vs heart block
- Check perfusion, recheck blood pressure
- Apply defibrillator pads
- Troubleshoot external pacemaker if already in place

4

Disability

- Assess pupils
- Ensure appropriate sedation and analgesia

5

Consider potential causes (Box C)

- Treat accordingly

6

Consider transcutaneous pacing (Box D)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS FOR BRADYCARDIA

- Atropine 300-600mcg / 0.5-1ml
- Glycopyrrolate 200-400mcg / 1-2ml
- Adrenaline 10-100mcg in **emergency only**
- Isoprenaline 0.01mcg/kg/min (increase in increments of 0.01 to max 0.15mcg/kg/min)

Box C: POTENTIAL CAUSES

- Medical causes:
 - Raised intracranial pressure (→ EAC)
 - Hypoxaemia (→ EAC)
 - Myocardial infarction or ischaemia (→ EAC)
 - Hyperkalaemia
 - Hypothermia
- Consider whether you could have made a drug error
- Consider known drug causes (e.g. excessive sedation or rate control agents)
- Temporary / permanent pacemaker system malfunction

BOX D: TRANSCUTANEOUS PACING

- Attach pads and ECG monitoring leads
- If patient conscious, consider sedation/analgesia (e.g. ketamine)
- Turn on PACING MODE
- Set RATE
- Increase PACER OUTPUT from 30 mA until electrical capture
- Confirm mechanical capture (central pulse) [reposition pads if nothing at 130mA]
- Set PACER OUTPUT 10 mA above capture

Bronchospasm

Signs and symptoms include: expiratory wheeze, prolonged expiration, increased inflation pressures, desaturation, hypercapnia, upsloping capnograph trace, silent chest

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan

2

Airway

- Own airway: confirm patency, listen for noise
- ETT/trache: confirm position/patency and exclude leak
- Check capnography trace

3

Breathing

- Check chest symmetry, breath sounds, RR, SpO₂, measured VTexp
- Absence of wheeze may indicate severe bronchospasm with no air movement
- Review airway pressure using ventilator and/or Mapleson C system
- Consider tracheal suction and aspirate nasogastric tube
- Consider muscle relaxation / additional sedation to optimise ventilation

4

Consider causes (Box B)

5

Treat bronchospasm (Box C) and underlying cause

- Optimise nebulised bronchodilators prior to IV agents to minimise VQ mismatch

6

Use appropriate ventilation strategy (Box D)

7

Next steps

- Consider lung ultrasound
- Consider arterial blood gas

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POTENTIAL CAUSES

- Lower airway obstruction: pulmonary oedema, asthma, COPD, anaphylaxis (→ EAC), malpositioned endotracheal tube
- Other causes of increased airway pressure (→ EAC)

Box C: DRUGS FOR BRONCHOSPASM (all safe in pregnancy)

- | | |
|-------------------------|--|
| • Salbutamol | • Nebuliser: 5mg |
| | • IV bolus: 250mcg diluted, slowly |
| | • IV infusion: 5-20mcg/min |
| • Ipratropium | • Nebuliser 0.5mg |
| • Adrenaline | • Nebuliser: 5ml of 1:1000 |
| | • IM: 500mcg (0.5ml 1:1,000) |
| | • Slow IV bolus: 10-100mcg (0.1 to 1ml 1:10,000) |
| • Magnesium | • 2g over 10 min |
| • Ketamine | • Bolus: 20mg (can repeat) |
| | • IV infusion: 0.5-1mg/kg/hr |
| • Hydrocortisone | • 200 mg IV bolus |

BOX D: VENTILATION STRATEGIES

- Increase expiratory time to allow complete expiration (reduce Ti and respiratory rate)
- Pressure control ventilation may be better
- Be alert to 'breath stacking' (you may need to manually decompress by disconnecting ventilator circuit)
- Permissive hypercapnia may be appropriate

Cardiac Arrest

Follow the latest Advanced Life Support guidelines. See Maternal Cardiac Arrest EAC for obstetric-specific information

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 Immediate actions**
 - Commence CPR
 - Apply pads and defibrillate as necessary (Box B)
 - Note time
 - Consider asking driver to call 999 and assist with CPR
- 2 Adequate oxygen delivery**
 - Give 100% oxygen
- 3 Airway and breathing**
 - Own airway: insert i-gel or intubate
 - ETT/trachea: confirm position
 - Ensure ventilator function adequate or manually ventilate with Mapleson C system (Water's system)
 - Use waveform capnography in all patients
- 4 Circulation**
 - Ensure patency of IV access, consider IO
 - Administer cardiac arrest drugs as indicated (Box C)
 - Continue CPR as required (rotate personnel as able)
- 5 Evaluate potential causes and act accordingly**
 - 4Hs / 4Ts / specific problems (Box D)
 - Consider ALS-compliant echo
- 6 Post-resuscitation care**
 - Optimise ventilation and oxygenation
 - Optimise perfusion
 - Ensure adequate sedation, analgesia and paralysis
 - Treat underlying cause (if able)
- 7 Next steps**
 - ROSC – follow Key Basic Plan
 - Death – follow EAC: Death During Transfer

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DEFIBRILLATION

- Follow instructions for your defibrillator to deliver ALS compliant defibrillation

Box C: DRUGS FOR CARDIAC ARREST

- Adrenaline 1mg (post-ROSC increments 10-100mcg)
- Amiodarone 300mg (after 3rd shock) and 150mg (after 5th shock)
- Magnesium 2g for polymorphic VT/hypomagnesaemia
- Calcium chloride 10ml 10% for hypocalcaemia or hyperkalaemia
- Fluid bolus 500ml

BOX D: POTENTIAL CAUSES

4 H's, 4 T's:

Hypoxia (→ EAC)
 Hypovolaemia (→ EAC)
 Hypo/hyperkalaemia
 Hypothermia
 Tamponade
 Thrombosis
 Toxins
 Tension pneumothorax

Specific problems:

Acidosis
 Interruption to RRT
 IABP problems
 Seizure (→ EAC)
 Critical intracranial pressure (→ EAC)
 Anaphylaxis (→ EAC)
 Drug error

BOX E: DO NOT FORGET

- Uterine displacement in pregnancy (>20/40 weeks)
- IABP – change triggering from ECG to pressure

Cardiac Ischaemia

Have a high index of suspicion with in patients with previous history or risk factors, particularly if unconscious and new haemodynamic changes

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Immediate actions**
 - Follow Key Basic Plan
 - Administer 100% oxygen
 - Perform 12 lead ECG
 - Consider new thrombosis vs excess myocardial oxygen demand
- 2 **Treat haemodynamic instability**
 - Cardiac arrest (→ EAC)
 - Hypotension (→ EAC)
 - Hypertension (→ EAC)
 - Bradycardia (→ EAC)
 - Tachycardia (→ EAC)
- 3 **If ischaemia does not resolve:**
 - Consider GTN if systolic BP $\geq$ 100mmHg (Box D)
- 4 **Next steps**
 - If patient condition significantly changed, consider where primary PCI is accessible:
 - Return to referring hospital
 - Expedite journey to receiving hospital

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- If the patient is unconscious, signs of cardiac ischaemia primarily include:
 - ST elevation or depression
 - T wave flattening or inversion
 - Arrhythmias, particularly ventricular
 - Other haemodynamic abnormalities (hypo- or hypertension, tachy- or bradycardia)
 - New or evolving regional wall motion abnormalities if echocardiography is used
- If the patient is conscious, symptoms may include chest pain, breathlessness, dizziness, nausea and vomiting

Box C: DRUGS FOR CARDIAC ISCHAEMIA

- **Glyceryl trinitrate (GTN):**
 - Consider sublingual administration
 - IV: 1mg/ml solution – start at 0.1ml/kg/hr, titrate to response
- **Oxygen:** titrate SpO₂ to 94-98%
- **Morphine:** 1mg boluses
- **Remember when in receiving hospital:** aspirin, beta blockers

Death During Transfer

The required actions described in the main guideline. Note these vary by country

START: AFTER TERMINATION OF CARDIAC ARREST MANAGEMENT OR RECOGNITION OF DETERIORATION WITH TREATMENT ESCALATION PLAN IN PLACE

- 1 **Verify death**
 - If doctor, ACCP or trained practitioner
 - Contact responsible consultant if not trained
- 2 **Inform**
 - Receiving hospital
 - Next of kin
 - Responsible consultant
- 3 **Manage patient after death**
 - In referring/receiving hospital: follow Trust processes
 - In ambulance: complete 'Last Offices' (see Box C)
- 4 **Contact mortuary**
 - Call 101 (police non-emergency number) and request information and contact details for **on-call** or **out-of-hours mortuary**
 - If remote support perform this, **ensure correct police force contacted for locality where patient has died**
- 5 **Complete documentation**
 - Ensure property is documented
 - Document name, contact details of mortuary and technician to whom body is handed to
- 6 **Next Steps**
 - Complete incident report form and further Trust processes on return to hospital

Box A: CONTACTING HELP

- Always contact responsible consultant
- If transferring for specialist intervention, consider contacting receiving hospital senior clinician for advice

Box B: INFORMING NEXT OF KIN

- **Responsibility**
 - Rests with escorting clinicians
- **How**
 - Usually by phone
 - As soon as practicable
 - Document in notes: time, information given, person informed
- **If NOK making way to receiving hospital**
 - Contact receiving hospital ASAP and agree plan

Box C: LAST OFFICES IN AMBULANCE

- Do not wash body
- Leave ETT, tracheostomy tube, all lines, devices and infusions
- Spigot urinary catheter
- Place absorbent pads in appropriate places
- Remove valuables and place in separate bag
- Place body in body bag

Box D: WELLBEING

- Prioritise team wellbeing once NOK aware and patient managed
- Stand down from clinical work
- Return to hospital and discuss with responsible consultant about continuation of clinical duties

Emergency Tracheostomy Management

This is an adaptation of the NTSP Emergency Tracheostomy Algorithm

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Assess patient breathing; Mapleson C system and waveform capnography
- If patient not breathing refer to Key Basic Plan

2 Oxygenation

- Apply high flow oxygen (15L/min) to both face and tracheostomy

3 Check tracheostomy patency

- Remove speaking valve and/or cap, remove inner cannula
- Try to pass suction catheter; if successful, suction then ventilate via trachea
- If tracheostomy remains obstructed, deflate cuff (if present) and reassess
- If patient breathing **STOP** this algorithm and complete A-E.

4 If patient is deteriorating – remove tracheostomy

- Look listen and feel. If patient is still **NOT** ventilating, **follow Cardiac Arrest EAC**. If patient breathing, follow Key Basic Plan.

5 Primary emergency oxygenation

- Cover stoma gauze and occlusive dressing
- Attempt standard oral airway manoeuvres + adjuncts with BVM +/- i-gel
- If unable to ventilate orally, attempt via stoma site using size 4 facemask.

6 Secondary emergency oxygenation

- Attempt ORAL Intubation
- Prepare for difficult intubation: **EAC: Unanticipated Difficult Intubation**
- Attempt intubation of stoma using smaller tracheostomy tube or 6.0 ETT

7 Next Steps

- Secure new airway
- A-E assessment.
- If patient condition significantly changed, consider:
- Return to referring hospital
- Expediting journey to receiving hospital

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS in Emergency Tracheostomy Care

- **Sedation**
 - Propofol 2% 1000mg/50ml; 20-40mg boluses (1-2ml)
 - Fentanyl 500mcg/10ml; 50-100mcg boluses (1-2ml)
- **Muscle relaxant bolus**
 - Rocuronium 50mg/5ml; 5ml bolus
- **Cardiovascular support**
 - Metaraminol 0.5mg/ml; increase infusion or 0.5mg (1ml) boluses

Box C: ISOLATE EQUIPMENT

- **Attempt ventilation** using Mapleson C system connecting **DIRECTLY** to Tracheostomy tube connector
- **DO NOT** use HME filter, angle piece or catheter mount
- Ensure **SUCTION** equipment ready, using size 12ch catheter
- Plan B, C, D pouch: gauze and occlusive dressing for tracheostomy **REMOVAL**

Box D: POTENTIAL CAUSES and Symptoms etc blue

- Consider potential causes:
 - Dislodged tracheostomy
 - Bronchospasm (→ EAC)
 - Sputum plugging
 - Pneumothorax
 - Foreign body

Hypotension

Hypotension can be multifactorial and due to the effects of the underlying patient pathology, sedation or a new problem

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Adequate oxygen delivery**
 - Follow Key Basic Plan
- 2 **Airway**
 - Check capnography trace
- 3 **Breathing**
 - Assess for high airway pressure to exclude high intrathoracic pressure as a cause
- 4 **Circulation**
 - Check rate, rhythm, perfusion
 - Re-check BP
 - If heart rate <60 bpm consider giving anticholinergic drug (Box B)
 - Consider altering position (e.g. supine / elevate legs)
 - Consider giving vasopressor (Box B) / verify running as intended
 - Consider rapid fluid bolus (250 ml).
- 5 **Drugs**
 - Optimise sedation and analgesia
- 6 **Consider potential causes (Box D)**
 - Treat accordingly

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DRUGS FOR HYPOTENSION

- Anticholinergic drugs:**
 - Glycopyrrolate 200-400mcg
 - Atropine 300-600mcg
- Vasopressor drugs:**
 - Metaraminol 0.5mg boluses [caution in bradycardia]
 - Adrenaline 10-100mcg boluses

Box C: POTENTIAL CAUSES

- Pneumothorax (→ EAC)
- High intra-thoracic (airway) pressure (→ EAC)
- Gas trapping
- Critical hypoxia (→ EAC)
- Cardiac ischaemia (→ EAC) or other cardiac abnormality
- Arrhythmia (→ EAC)
- Blood loss
- Cardiac tamponade (→ EAC)
- Pulmonary embolism
- Sepsis
- Anaphylaxis (→ EAC)
- Vasoplegia
- Diuresis (e.g. secondary to mannitol, diabetes insipidus)
- Drug error

Hypertension

Hypertension is most commonly related to sedation and/or analgesia. The commonest pathological cause is a neurosurgical crisis

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Immediate actions**
 - Follow Key Basic Plan.
 - Recheck blood pressure, confirm correct NIBP cuff size, confirm arterial line transducer location appropriate
 - If pregnant, see Hypertension in Pregnancy EAC
- 2 **Breathing**
 - Exclude **hypoxia** and **hypercarbia** as causes
 - Assess for high airway pressure
- 3 **Circulation**
 - Check rate, rhythm, perfusion
- 4 **Drugs**
 - Optimise sedation and analgesia
 - Consider additional muscle relaxation
- 5 **Consider potential causes (Box B)**
 - Treat accordingly
- 6 **Consider temporising drug (Box C) if problem not resolving**
 - Patient may require multiple agents

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POTENTIAL CAUSES

- Inadequate sedation / analgesia
- Inadequate neuromuscular blockade
- Consider whether you could have made a drug error
- Medical causes:
 - Raised intracranial pressure (→ EAC)
 - Seizure (→ EAC)
 - Serotonin syndrome
- Distended bladder
- Omission of usual antihypertensives

Box C: TEMPORISING DRUGS FOR HYPERTENSION

- Alfentanil (0.5-1mg / 0.5-1ml)
- Fentanyl (50-100mcg / 0.5-1ml)
- Propofol bolus (depending upon patient, 10-20mg / 1-2ml 1% or 0.5-1ml 2%)
- Labetalol 0.25mg/kg (12.5-25mg / 2.5-5ml); repeat as necessary
- Esmolol 0.5mg/kg over 30 seconds; follow with infusion of 0.3mg/kg/min
- Glyceryl trinitrate 2-20ml/hr of 1mg/ml solution

Hypoxia

Manage all patients during a hypoxic crisis on 100% oxygen regardless of underlying lung pathology

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Adequate oxygen delivery**
 - Follow Key Basic Plan
 - If SpO₂ low, is it accurate? Consider whether poor perfusion could be the problem

- 2 **Airway**
 - Own airway: confirm patency, listen for noise
 - ETT/trache: confirm position/patency and exclude leak
 - Check capnography trace
 - Consider whether you need to isolate equipment (Box B)

- 3 **Breathing**
 - Check chest symmetry, breath sounds, RR, SpO₂, measured VTexp
 - Is there ET CO₂?
 - Review airway pressure using ventilator and/or Mapleson C system
 - Consider possible causes (Box C) and potential actions:
 - Suction, bronchodilator, additional PEEP, diuretic, fluid challenge
 - Consider muscle relaxation / additional sedation to optimise ventilation

- 4 **Circulation**
 - Check rate, rhythm, perfusion
 - Re-check BP, verify cardiovascular infusions and fluid running
 - If circulation unstable, consider if this is secondary to hypoxia

- 5 **Equipment**
 - Check power, oxygen, pumps and monitoring

- 6 **Next steps**
 - Consider lung ultrasound
 - Consider arterial blood gas

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT

- Ventilate lungs using Mapleson C system connected **DIRECTLY** to ETT or tracheostomy tube connector
- DO NOT** use the HME filter, angle piece or catheter mount
- If remains difficult to ventilate with Mapleson C system, re-connect ventilator
- If increased pressure **NOT** manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: **check and replace**

Box C: POTENTIAL CAUSES

- Increased airway pressure (→ EAC)
- Inadequate chest movement or expired volume: assist/increase ventilation
- Asymmetrical chest expansion:
 - Exclude bronchial intubation/foreign body/pneumothorax
- Consider other potential causes:
 - Laryngospasm and stridor (→ EAC)
 - Bronchospasm (→ EAC)
 - Anaphylaxis (→ EAC)
 - Circulatory embolism
 - Cardiac ischaemia (or infarction) (→ EAC)
 - Cardiac tamponade
 - Unrecognised blood loss
 - Aspiration
 - Pulmonary oedema

Increased Airway Pressure

Using these steps should identify any cause of increased airway pressure. Avoid spending excessive time on one aspect until you have run through the entire EAC

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Adequate oxygen delivery**
 - Follow Key Basic Plan
 - Confirm increased airway pressure by switching to hand ventilation (<3 breaths)
- 2 **Airway**
 - ETT/trache: confirm position/patency and exclude leak
 - Check capnography trace
 - Consider whether you need to isolate equipment (Box B)
- 3 **Breathing**
 - Check chest symmetry, breath sounds, RR, SpO₂, measured VTexp
 - Review airway pressure using ventilator and/or Mapleson C system
 - Consider potential causes (Box C) and actions:
 - Suction, bronchodilator, diuretic
 - Give additional muscle relaxation
 - Does expiratory flow trace return to zero (i.e. is gas trapping occurring)?
- 4 **Circulation**
 - Check rate, rhythm, perfusion
 - Re-check BP
 - If circulation unstable, consider if it is due to gas trapping
- 5 **Drugs**
 - Optimise sedation and analgesia
- 6 **Next steps**
 - Consider lung ultrasound

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: ISOLATE EQUIPMENT

- Ventilate lungs using Mapleson C system connected **DIRECTLY** to ETT or tracheostomy tube connector
- DO NOT** use the HME filter, angle piece or catheter mount
- If increased pressure manually confirmed, re-connect ventilator
- If increased pressure **NOT** manually confirmed, assume problem with ventilator/circuit/HMEF/catheter mount: **check and replace**

Box C: POTENTIAL CAUSES

- Inadequate neuromuscular blockade
- Consider potential causes:
- Bronchospasm (→ EAC)
- Pneumothorax
- Bronchial intubation
- Sputum plugging
- Anaphylaxis (→ EAC)
- Laryngospasm and stridor (→ EAC)
- Pulmonary oedema
- Foreign body

Management of Suspected Raised Intracranial Pressure

Manage all patients during a hypoxic crisis on 100% oxygen regardless of underlying lung pathology

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1 Immediate actions

- Follow Key Basic Plan.
- Have neuroprotective strategies all been followed (Box B)?
- Could this be a seizure?

2 Patient positioning

- Sit patient up as much as possible (caution: spinal injury)

3 Oxygenation and ventilation

- Deliver 100% oxygen
- Aim ETCO_2 4.0-5.0kPa (or PaCO_2 4.5-5.5kPa)

4 Sedation, analgesia and muscle relaxation

- Administer boluses (Box C)

5 Osmotherapy

- Administer 5% sodium chloride bolus (and subsequent bolus after 10 minutes if $\text{Na} < 150\text{mmol/L}$) (Box C)

6 Reassess patient

- If continued evidence of uncontrolled intracranial pressure (eg. fixed and dilated pupil), consider increased minute ventilation to reduce PaCO_2 to 3.5-4.0kPa

7 Next steps

- Inform receiving hospital neurosurgical team as destination may need to change (e.g. straight to theatre or repeat imaging)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: SYMPTOMS AND SIGNS

- **Physical:**
 - Head up 30° and neutral head position
 - Check tube ties
- **Ventilation:**
 - PaO_2 10-13kPa
 - PaCO_2 4.5-5.5kPa
- **Blood pressure:**
 - Assume ICP 20
 - CPP 60-70 will be achieved with a MAP of 80-90mmHg
- **Sedation:** RASS -5
- **Blood sugar:** 6-10mmol/L
- **Serum sodium:** 140-155mmol/L
- **Temperature:** $< 37.5^\circ\text{C}$
- **Seizure prophylaxis:** 1g levetiracetam BD

Box C: DRUGS FOR RAISED INTRACRANIAL PRESSURE

- **Sedation bolus:**
 - 10-20mg propofol
 - 1-2mg midazolam
- **Analgesia bolus:**
 - 50-100mcg fentanyl
 - 0.5-1mg alfentanil
 - 1-2mg morphine
- **Muscle relaxant bolus:** 50mg atracurium or rocuronium
- **Hypertonic saline:** 5% sodium chloride 3ml/kg or 3% sodium chloride 5ml/kg

Obstetrics: Hypertension in Pregnancy

See Hypertension EAC for non-pregnant patients

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen

2

Confirm diagnosis (Box B) and examine for signs of pre-eclampsia

- Severe headache, visual disturbance
- Epigastric tenderness, oedema, clonus, hyperreflexia

3

Treat hypertension (Box C)

- Start IV labetalol unless still at referring hospital

4

Fluid restrict to 80ml/hr (or 1ml/kg/hr)

5

Monitor BP every 15 minutes

6

Next steps

- Consider arterial blood gas
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: PHYSIOLOGICAL PARAMETERS

- **Target BP** <135/85mmHg ($\leq 150/80$ -100mmHg if in labour)
- **Target SpO₂** >95%
- Degrees of hypertension in pregnancy:
 - Mild/moderate: 140-159/90-109mmHg
 - Severe: $\geq 160/110$ mmHg

Box C: DRUGS FOR HYPERTENSION IN PREGNANCY

- First line: labetalol 200mg PO
- Second line: nifedipine 10mg PO
- **Third line (and when in transfer):** IV labetalol (see Box D)
- Fourth line: IV hydralazine

Box D: IV LABETALOL FOR HYPERTENSION IN PREGNANCY

Loading dose (IV):

- 50 mg (10mls of 5mg/ml neat solution) over at least 1 min – BP should fall below threshold within 5 mins
- Repeat at 15 mins intervals to a max dose of 200mg until BP controlled

Maintenance dose (IV infusion):

- Infusion 4ml/hr (5mg/ml neat solution)
- Double every 30 mins to a max of 32 ml/hr (160mg) until BP is controlled
- Titrate to keep SBP 140-150mmHg DBP 90-100 mmHg

Obstetrics: Maternal Cardiac Arrest

Use this EAC alongside the Cardiac Arrest EAC. Emergency hysterotomy should be performed within 5 minutes of collapse

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Commence CPR using standard hand position
- If >20/40 (or uterus palpable above umbilicus): manually displace uterus to patient's left
- Apply pads in standard position and defibrillate as necessary (Box B)
- Note time
- Ask driver to call 999 and assist with CPR

2

Adequate oxygen delivery

- Give 100% oxygen

3

Airway and breathing

- Own airway: insert i-gel or intubate
- ETT/trachea: confirm position
- Ensure ventilator function adequate or manually ventilate with Mapleson C system (Water's system)
- Use waveform capnography in all patients

4

Circulation

- Ensure patency of IV access, consider IO
- Administer cardiac arrest drugs as indicated (Box C)
- Continue CPR as required (rotate personnel as able)

5

Evaluate potential causes and act accordingly

- 4Hs / 4Ts / specific problems (Box D in Cardiac Arrest EAC)
- Consider ALS-compliant echo

6

Perform a time sensitive resuscitative hysterotomy IF SKILLS AND RESOURCES ALLOW

7

Next steps

- Patient **will require anaesthesia** if ROSC achieved
- Consider arterial blood gas, uterotonic drugs, TXA
- Uterine tamponade/sutures, manual aortic compression
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DEFIBRILLATION (use standard pad position and energy)

- Follow instructions for your defibrillator to deliver ALS compliant defibrillation

Box C: DRUGS FOR CARDIAC ARREST

- Adrenaline 1mg (post-ROSC increments 10-100mcg)
- Amiodarone 300mg (after 3rd shock) and 150mg (after 5th shock)
- Magnesium 2g for polymorphic VT/hypomagnesaemia
- Calcium chloride 10ml 10% for hypocalcaemia or hyperkalaemia
- Fluid bolus 500ml

Box D: RESUSCITATIVE HYSTEROTOMY

- Perform if $\geq 20/40$ to improve maternal outcome and no ROSC at four minutes following cardiac arrest
- Make vertical incision from umbilicus to symphysis pubis through skin, subcutaneous fat, linea alba and peritoneum (note bladder lies over lower uterus)
- Make vertical incision in the midline in the upper segment of uterus. Extend upwards with scissors. Cut through placenta if in the way. Use fingers to stretch uterine incision
- Locate presenting part of baby (head, bottom, foot) and lift out of uterus. Do not pull on an arm. Use fundal pressure to aid delivery
- Apply two Spencer-Wells clamps to cord and cut immediately with scissors
- Hand baby to another team member (if available) to commence NLS
- Direct pressure to uterine incision edges if bleeding. Have one attempt to separate placenta; place in clinical waste bag
- Pack open abdomen with gauze
- Continue maternal resuscitation and follow point 7 if ROSC

Obstetrics: Normal Delivery

Normal vaginal delivery based on the Pre-Hospital PROMPT training course (adapted with permission)

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Assess contraction interval and look for signs of imminent birth (Box B)**
 - Visually inspect (with mother's consent) to see if head visible at vulva
- 2 **Prepare for delivery**
 - Warm ambulance cabin using heater; keep doors closed
 - Incontinence pads + maternity pack + blankets from cupboard
 - Support mother in comfortable position (sitting or all fours)
- 3 **Advise mother to pant**
 - Helps slow birth of head
 - Apply gentle pressure as head advances
- 4 **Support head and body as baby is born; lift onto mother's abdomen**
 - Note time
- 5 **Immediately dry baby and make initial assessment**
 - Crying:** "skin-to-skin" with mother to keep warm
 - Not crying:** confirm airway open (head in neutral position)
 - Not breathing:** commence Newborn Life Support with midwife (if present).
 - If no midwife and NLS required, consider calling 999**
- 6 **Remove wet towel/blanket and replace with new one**
 - See box C for cord clamping and cutting
 - Continue to monitor baby – ensure they remain warm and a good colour
 - Mother may breastfeed
- 7 **Delivery of placenta**
 - May take 15-20 minutes. DO NOT PULL ON CORD
 - Deliver into bowl or plastic bag and keep for inspection
 - Blood loss is typically 200-300ml (difficult to assess; keep sheets etc)
 - If placenta does not deliver and minimal bleeding, continue journey
 - If bleeding → EAC: Obstetrics: Post Partum Haemorrhage

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: STAGES OF LABOUR

- First: painful regular contractions; foetal head descends and rotates
- Second: fully dilated cervix until birth
- Signs of imminent birth:
 - Strong contractions every 1-2mins
 - Urge to push/bear down
 - Head visible (particularly if multiparous mother)
- Third: placenta and membranes (allow placenta to be expelled spontaneously)

Box C: CORD CLAMPING & CUTTING

- If mother and baby well: no urgency – wait for cord to stop pulsating (60sec) prior to clamping and cutting
- If emergency with mother or baby, cut cord immediately
- To cut:
 - Apply two cord clamps 15cm from umbilicus and 3cm apart
 - Cut cord in between clamps

BOX D: DO NOT FORGET

- Record time of birth
- Keep all linen and incontinence pads so blood loss can be estimated
- Communicate with receiving hospital delivery suite as soon as practicable

Obstetrics: Seizures in Pregnancy (Pre-Eclampsia)

See Seizures Exercise-Associated Collapse (EAC) for non-pregnant patients

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen

2

If >20/40 gestation and eclampsia possible (see Box B), treat

- Bolus magnesium sulphate (Box C)

3

Commence magnesium sulphate infusion (Box C)

4

If further seizure(s) give additional magnesium (Box C)

- Consider options on Seizure EAC including additional drugs (Box D) and intubation

5

Next steps

- Consider arterial blood gas
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: FEATURES OF ECLAMPSIA

- Severe headache, visual disturbance
- Epigastric tenderness, oedema, clonus, hyperreflexia

Box C: MAGNESIUM SULPHATE FOR SEIZURES IN PREGNANCY

- **Loading:** 4g (8ml) MgSO_4 made up to 20ml with 0.9% sodium chloride. Give as slow bolus over 5-10 minutes.
- **Maintenance:** 10g (20ml) MgSO_4 made up to 50ml with 0.9% sodium chloride (concentration 0.2g/ml); give 5ml/hr (1g/hr).
- **Further seizures:** 2-4g (4-8ml) made up to 10ml; bolus 5-10 minutes

Box D: FURTHER SEIZURE MANAGEMENT (safe in pregnancy)

- **Terminate:** 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- **Give prophylaxis:** 1g levetiracetam IV (if not already received)

Obstetrics: Post-Partum Haemorrhage

See Seizures Exercise-Associated Collapse (EAC) for non-pregnant patients

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen
- Lie flat

2

Massage uterus, consider bimanual compression

- Assess where bleeding coming from (Box C)
- Apply pressure to tear, if visible

3

Sytocinon 10IU intramuscular injection

4

Replace volume (up to 2L crystalloid)

- Consider options on Seizure EAC including additional drugs (Box D) and intubation

5

Consider

- Tranexamic acid 1g IV

6

Next steps

- Consider arterial blood gas
- Key Basic Plan
- Inform receiving hospital Central Delivery Suite and obstetrician – consider whether you need blood products on arrival

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: POST-PARTUM HAEMORRHAGE DEFINITIONS

- **Primary** – blood loss $\geq 500\text{ml}$ within first 24h following delivery
- **Secondary** – blood loss $\geq 500\text{ml}$ more than 24h and less than six weeks following delivery
- **Types:**
 - Minor: 500-999ml
 - Moderate 1000-1999ml
 - Severe $>2000\text{ml}$
- **Causes:**
 - Tone (uterine tone accounts for 75-90%)
 - Trauma (vaginal/cervical lacerations, ruptured uterus)
 - Tissue (retained products – ensure placenta complete)
 - Thrombin (coagulopathy)

Box C: CAUSES OF POST-PARTUM HAEMORRHAGE

- Tone (uterine tone accounts for 75-90%)
- Trauma (vaginal/cervical lacerations, ruptured uterus)
- Tissue (retained products – ensure placenta complete)
- Thrombin (coagulopathy)

Seizure Management

Manage all patients on 100% oxygen

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Deliver 100% oxygen
- If pregnant, see Seizures in Pregnancy EAC

2

Consider: is seizure a likely diagnosis?

- Clinical features (Box B)
- Patient pathology

3

Check blood glucose

4

Treat seizure

- **Terminate:** 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- **Give prophylaxis:** 1g levetiracetam IV (if not already received)

5

Further or refractory seizures

- If continues to exhibit seizure activity after 10 minutes:
 - Further 2-4mg midazolam IV or propofol sedation bolus 10-20mg IV
- Administer:
 - Additional 1g levetiracetam
- Consider general anaesthesia to secure airway and manage seizure

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: FEATURES SUGGESTIVE OF SEIZURE ACTIVITY

- Abnormal limb movements
- Abnormal pupillary response
- Hypertension
- Tachycardia

Tachycardia

Tachycardia may be the result of underlying disease process, new pathology or related to treatment

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

1

Immediate actions

- Follow Key Basic Plan
- Check pulse
 - If no pulse, treat as cardiac arrest (→ EAC)
 - If critical hypotension, perform DC cardioversion (Box B)

2

Breathing

- Exclude **hypoxia** and **hypercarbia** as causes

3

Circulation

- Check rhythm – differentiate sinus vs SVT/VT
- Check perfusion, recheck blood pressure
- Perform 12 lead ECG
- Apply defibrillator pads

4

Disability

- Ensure appropriate sedation and analgesia

5

Consider potential causes (Box C)

- Treat accordingly

6

Consider rate control (Box D)

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: DC CARDIOVERSION

- Ensure adequate sedation / analgesia (consider ketamine)
- Press synchronise button and check for dot above R wave
- Deliver shock

Box C: POTENTIAL CAUSES

- | | |
|---|--|
| <ul style="list-style-type: none"> • Medical causes: <ul style="list-style-type: none"> • Hypovolaemia • Hypoxia (→ EAC) • Hypercarbia • Malignant arrhythmia • Myocardial ischaemia or infarction (→ EAC) • Electrolyte disturbance • Raised intracranial pressure (→ EAC) • Anaphylaxis (→ EAC) | <ul style="list-style-type: none"> • Inadequate sedation / analgesia • Consider drug error |
|---|--|

BOX D: DRUGS FOR TACHYCARDIA

- Fluid bolus 250ml (consider blood if haemorrhage suspected)
- Magnesium 2g over 10min
- Amiodarone 300mg over 3-5min (avoid in pregnancy unless no alternative)
- Labetalol 0.25mg/kg (12.5-25mg / 2.5-5ml); repeat as necessary
- Esmolol 0.5mg/kg over 30secs; follow with infusion of 0.3mg/kg/min
- Adenosine 6mg then 12mg for SVT

Tension Pneumothorax

Manage all patients on 100% oxygen

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Immediate actions**
 - Follow Key Basic Plan
 - Deliver 100% oxygen
- 2 **Confirm diagnosis (Box B)**
- 3 **Consider alternative diagnoses (Box C)**
- 4 **Treat tension pneumothorax**
 - Positively confirm affected side and state this to team
 - Remove cannulation and thoracostomy pouches from Primary Bag
 - Perform needle decompression:
 - 14G cannula
 - 2nd intercostal space
 - Mid-clavicular line
 - Perform finger thoracostomy:
 - Optimise patient position (arm out/hand behind head)
 - Identify landmarks
 - 5th intercostal space
 - Point between mid- and anterior axillary line
 - Clean skin with Chloraprep
 - Make skin incision (2cm) along line of rib
 - Blunt dissection to pleural cavity with Spencer Wells
 - Perform finger sweep
 - Re-evaluate patient
 - Remember thoracostomies can become obstructed with arm in normal position / large body habitus
- 5 **Next steps**
 - Consider arterial blood gas
 - Key Basic Plan

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: CONFIRM DIAGNOSIS

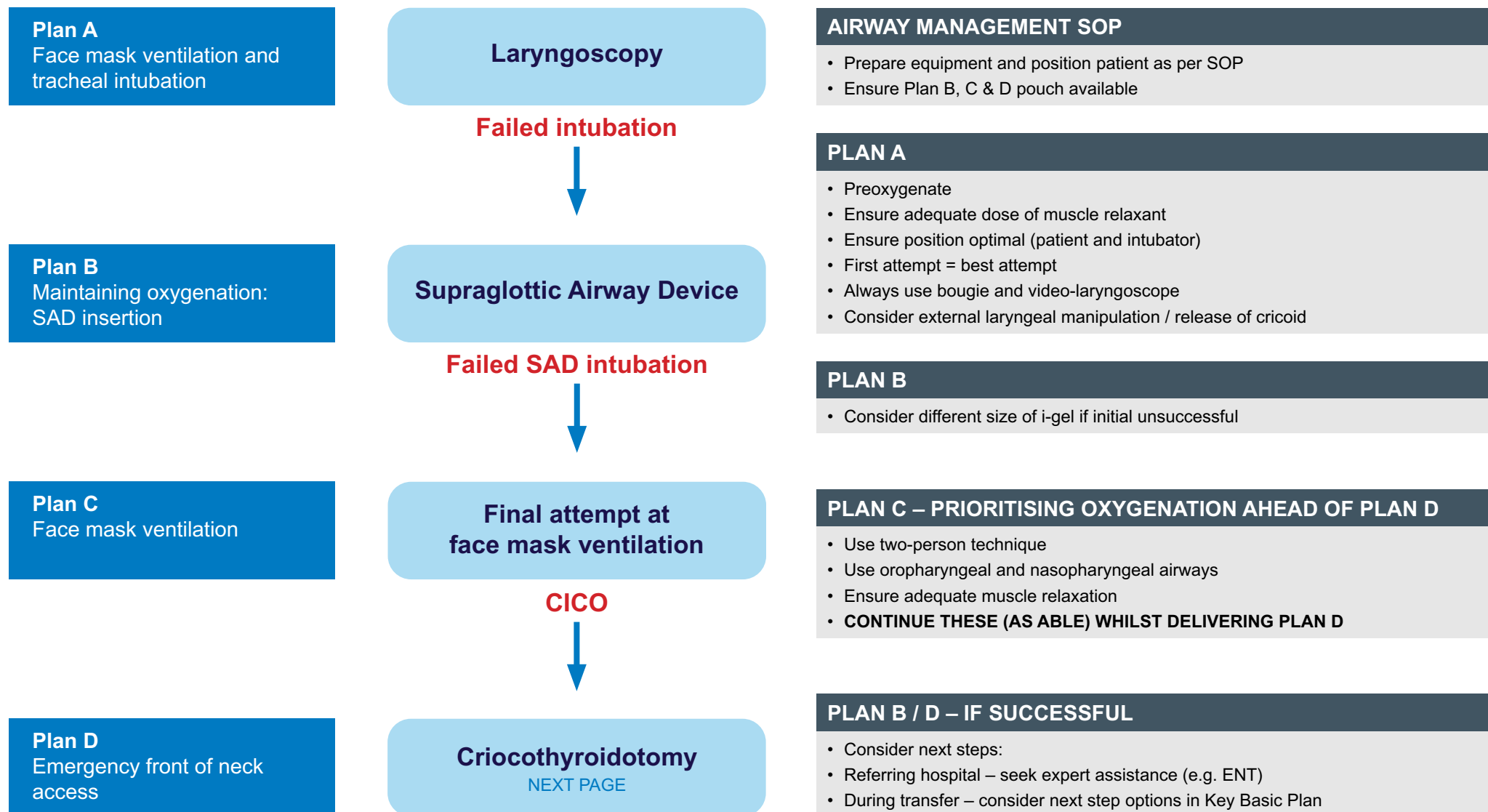
- High airway pressure
- Progressive desaturation
- Chest movement asymmetry
- Hypotension
- Reduced/absent breath sounds
- Absence of lung sliding/B-lines/lung pulse on ultrasound

Box C: ALTERNATIVE DIAGNOSES

- Endobronchial intubation
- Mucus plugging
- Anaphylaxis
- Obstruction / kinking of existing intercostal chest drain
- Severe bronchospasm
- Inadequate muscle relaxation
- Cardiac tamponade
- Haemothorax

Unanticipated Difficult Intubation

This is an adaptation of the Difficult Airway Society Guidelines



Unanticipated Difficult Intubation: Scalpel Cricothyroidotomy

This is an adaptation of the Difficult Airway Society Guidelines

Scalpel cricothyroidotomy

Equipment: 1. Scalpel (number 10 blade)
2. Bougie
3. Tube (cuffed 6.0mm ID)

Laryngeal handshake to identify cricothyroid membrane

Palpable cricothyroid membrane

- Transverse stab incision through cricothyroid membrane
- Turn blade through 90° (sharp edge gradually)
- Slide coude tip of bougie along blade into trachea
- Railroad lubricated 6.0mm cuffed tracheal tube into trachea
- Ventilate, inflate cuff and confirm position with capnography
- Secure tube

Impalpable cricothyroid membrane

- Make an 8-10cm vertical skin incision, caudad to cephalad
- Use blunt dissection with fingers of both hands to separate tissues
- Identify and stabilise the larynx
- Proceed with technique for palpable cricothyroid membrane as above

EQUIPMENT

- Plan B, C and D pouch
- Sharps bins in ambulance

PLAN D – IF SUCCESSFUL

- Consider next steps:
- Referring hospital – seek expert assistance (e.g. ENT)
- During transfer – consider next step options in Key Basic Plan

EMERGENCY ACTION CARDS

Non-Clinical Scenarios

Ambulance Breakdown

These are the clinical team actions; the driver and ambulance provider will have separate actions

START

1**Prioritise team and patient safety**

- Is the vehicle in a safe place and visible to oncoming traffic?
- Do the police need to be informed?
- Who needs to remain in the vehicle if a patient is on board?
- Is there risk of fire?
- Could weather hinder progress of a replacement vehicle?

2**Consider patient safety (assume you will have 1-2 hour delay)**

- Is the patient clinically stable?
- Is there sufficient oxygen supply?
- How long are the team prepared to wait for replacement vehicle?
- Infusion / drug supply
- Equipment battery life if inverter off
- Where is the nearest appropriate hospital in relation to current position?

3**Leave vehicle if safe to do so**

- Don high visibility jackets
- If no patient on board, take drug bag with you

4**Contact responsible consultant****5****Contact referring or receiving hospital**

- Inform of breakdown and keep them updated
- Consider need for alternate ambulance transport via 999

Box A: RELATED EACS

- Oxygen supply failure
- Electrical supply failure

Electrical Supply Failure

Failure of power to equipment or failure of ambulance inverter

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Ensure ventilation continues**
 - Manual ventilation if required
 - Consider moving to spontaneous ventilation
- 2 **Ensure sedation and analgesia continues**
- 3 **Check battery percentage in**
 - Ventilator
 - Monitor
 - Pumps
- 4 **Consider turning off and then turning on ambulance ignition**
 - This will reboot the inverter
- 5 **Consider prioritisation of infused drugs**
 - Use hand bolus delivery for others, where required
- 6 **Check the pulse and blood pressure manually if monitors have failed**
- 7 **Consider adequacy of remaining battery supply. Is there a need to:**
 - Return to referring hospital?
 - Diversion to nearest Emergency Department?
 - Expedite journey to receiving hospital?

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: EQUIPMENT BATTERY LIFE

Hamilton T1	• 4 hours per battery (8 hours total) • Indicator per battery as %
Zoll X-series	• 5 lights – 3 hours • 4 lights – 2 hours • 3 lights – 1 hour
B.Braun	• 4-6 hours (at 100ml/h)
[add local equipment here]	

Oxygen Failure: Non-clinical scenarios

Failure of oxygen cylinder or ambulance wall supply

START: IMMEDIATELY NOTIFY DRIVER, STOP SAFELY

- 1 **Check oxygen cylinder contents (Box B)**
 - CD / E on trolley
 - ZX in ambulance
- 2 **Connect to alternate supply – CD / E cylinder on trolley**
- 3 **Change oxygen cylinder**
 - Turn off cylinder valve before changing / removing regulator (E cylinder)
 - Remember ZX has to be moved to be changed
- 4 **Consider adequacy of remaining oxygen reserves for planned transfer**
 - Recalculate oxygen requirement (Box C)
 - Is there a need to:
 - Return to referring hospital
 - Diversion to nearest Emergency Department
 - Expedite journey to receiving hospital
- 5 **Post-transfer**
 - Do you need to return to base to restock oxygen supply?
 - If wall supply failure, report to ambulance provider

Box A: CRITICAL CHANGES

- If problem worsens significantly, or a new problem arises, go back to **START** of Key Basic Plan
- Consider contacting responsible consultant for senior remote advice

Box B: OXYGEN CYLINDER CONTENTS

% full	CYLINDER SIZE		
	CD	E	ZX
100%	460L	680L	3040L
50%	230L	340L	1520L
25%	115L	170L	760L

BOX C: OXYGEN CALCULATOR

- **Hamilton ventilator**
 - $((MV + 3) \times (FiO_2 1.0) \times (2 \times \text{remaining transfer time in mins})) = \text{requirement}$
- **Oxylog ventilator**
 - $((MV + 0.5) \times (FiO_2 1.0) \times (2 \times \text{remaining transfer time in mins})) = \text{requirement}$

Roadside Incident

The main priorities for clinical team

START

- 1 Prioritise team and patient safety**
 - Is the vehicle in a safe place and visible to oncoming traffic?
 - If patient on-board, ensure care continues.** In the event of an incident involving the ambulance, prioritise both crew safety and patient care
 - Don high visibility vest or jacket** before getting out of vehicle
 - Be aware of other traffic – **do not enter live carriageway**
 - Do not approach vehicles where there are signs of smoke or fire** (consider moving team and vehicle back 50m)
- 2 Assess incident**
 - Do not** enter vehicles if at all possible
 - Are there any injured parties? How many and how serious are their injuries?
 - Are other emergency services present or have they been contacted?
 - No injuries:** police
 - Injuries:** police / fire / ambulance
- 3 Administer roadside care (Boxes A, B, C)**
 - Use ambulance equipment +/- your equipment (if required)
 - Care provided to third parties should always be limited to Good Samaritan care
 - Ensure clinical responsibility is handed over to attending emergency services when appropriate
- 4 Contact responsible consultant**
 - Contact hospital to inform of delay (if required)

Box A: TIME CRITICAL

- No legal responsibility to stop
- Professional responsibility to provide first aid and ensure emergency services activated
- If injured party at immediate risk of death, provide Good Samaritan aid
- If no immediate risk of death, continue to destination

Box B: NON-TIME CRITICAL

- No legal responsibility to stop
- Professional responsibility to provide first aid and ensure emergency services activated
- If injured party at immediate risk of death, provide Good Samaritan aid
- Await emergency services and hand over care**

Box C: GOOD SAMARITAN CARE

- c – direct pressure applied to catastrophic external haemorrhage
- c – cervical spine control and support
- A – airway opening manoeuvres and support with simple adjuncts (OPA/NPA). In the setting of cardiac arrest, insertion of an iGel™ would be appropriate
- B – ventilatory assistance with a bag-valve-mask if required, administration of oxygen
- C – CPR and defibrillation provided as required